Andrew Owens

CONTACT INFORMATION

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EECS 4231
University of Michigan

EDUCATION

Massachusetts Institute of Technology 2013 – 2016
Ph.D., Electrical Engineering and Computer Science
Advisors: William Freeman and Antonio Torralba
Thesis: *Learning Visual Models from Paired Audio-Visual Examples*

Massachusetts Institute of Technology 2010 – 2013
M.S., Electrical Engineering and Computer Science
Advisors: William Freeman and Antonio Torralba

Cornell University 2006 – 2010
B.A., Computer Science
Advisors: Daniel Huttenlocher and Noah Snavely

EXPERIENCE

University of Michigan 2020 – present
Assistant Professor
Electrical Engineering and Computer Science

UC Berkeley 2016 – 2019
Postdoctoral Researcher
Advisors: Alexei Efros and Jitendra Malik

Microsoft Research, Redmond, WA Summer 2014
Research Intern
Advisor: Rick Szeliski

Google, Seattle, WA Summer 2011
Software Engineering Research Intern
Advisor: Sameer Agarwal

HONORS

NSF CAREER, 2024
UMich 1938E Award, 2024
Outstanding Reviewer Award, ICASSP 2023
UMich EECS Outstanding Achievement Award, 2022
Sony Research Award 2021
Best Paper Award, Honorable Mention. WACV 2022
Outstanding Reviewer Award, NeurIPS 2021
RA-L Best Paper Award Finalist, 2018
Best Reviewer Award, ICLR 2018
Microsoft Research Fellowship, 2015 - 2016
NSF Graduate Research Fellowship, 2012 (declined)
NDSEG Fellowship, 2011 - 2014
Best Paper Award, Honorable Mention. CVPR 2011
CRA Outstanding Undergraduate Researcher Award – Finalist, 2010

FUNDING

NSF CAREER Award ($599,778), 2024

Title: Career: Learning Multimodal Representations of the Physical World

DARPA Grant, subcontractor for Kitware, Inc. ($633,195), 2020 - 2024
Title: Semantic Information Defender

Toyota Research Institute ($125,254), 2022-2023
Title: Meta-Learning Compositional Representations for 3D Video Understanding

Sony ($100,000) 2022-2023
Title: Learning auditory scene analysis for complex environments through audio-visual cycle consistency

Cisco Systems
Learning Audio-Visual Grouping, ($149,999) 2021-2022
Learning Correspondence-based Measures of Image Similarity ($149,999), 2022-2023
Gift funding ($100,000), 2023

Adobe gift ($10,000), 2022

Publications

Conference and Journal Publications:

Students from my group (at the time of doing the work) are indicated with the following colors: blue for PhD students, purple for MS students, and green for undergraduate students.

Preprints:

[1] Ziyang Chen, Daniel Geng, **Andrew Owens**. Images that Sound: Composing Images and Sounds on a Single Canvas. *arXiv*, 2024.

Conference and journal publications:

[1] Daniel Geng, Inbum Park, **Andrew Owens**. Factorized Diffusion: Perceptual Illusions by Noise Decomposition. *European Conference on Computer Vision (ECCV)*, 2024.

[2] Ayush Shrivastava, **Andrew Owens**. Self-Supervised Any-Point Tracking by Contrastive Random Walks. *European Conference on Computer Vision (ECCV)*, 2024.

[3] Tingle Li, Renhao Wang, Po-Yao Huang, **Andrew Owens**, Gopala Krishna Anumanchipalli. Self-Supervised Audio-Visual Soundscape Stylization. *European Conference on Computer Vision (ECCV)*, 2024.

[4] Yiming Dou, Fengyu Yang, Yi Liu, Antonio Loquercio, **Andrew Owens**. Tactile-Augmented Radiance Fields. *Computer Vision and Pattern Recognition (CVPR)*, 2024.

[5] Daniel Geng, Inbum Park, **Andrew Owens**. Visual Anagrams: Generating Multi-View Optical Illusions with Diffusion Models. *Computer Vision and Pattern Recognition (CVPR)*, 2024.

[6] Ziyang Chen, Israel D. Gebru, Christian Richardt, Anurag Kumar, William Laney, **Andrew Owens**, Alexander Richard. Real Acoustic Fields: An Audio-Visual Room Acoustics Dataset and Benchmark. *Computer Vision and Pattern Recognition (CVPR)*, 2024.

[7] Fengyu Yang, Chao Feng, Ziyang Chen, Hyoungseob Park, Daniel Wang, Yiming Dou, Ziyao Zeng, Xien Chen, Rit Gangopadhyay, **Andrew Owens**, Alex Wong. Binding Touch to Everything: Learning Unified Multimodal Tactile Representations. *Computer Vision and Pattern Recognition (CVPR)*, 2024.

[8] Zihao Wei, Zixuan Pan, **Andrew Owens**. Masking Clusters in Vision-Language Pretraining. *Computer Vision and Pattern Recognition (CVPR)*, 2024.

[9] Daniel Geng, **Andrew Owens**. Motion Guidance: Diffusion-Based Image Editing with Differentiable Motion Estimators. *International Conference on Learning Representations (ICLR) 2024*, 2024.

[10] Zhaoying Pan, Daniel Geng, **Andrew Owens**. Self-Supervised Motion Magnification by Backpropagating Through Optical Flow. *Neural Information Processing Systems (NeurIPS)*, 2023.

[11] Ziyang Chen, Shengyi Qian, **Andrew Owens**. Sound Localization from Motion: Jointly Learning Sound Direction and Camera Rotation. *International Conference on Computer Vision (ICCV)*, 2023.

[12] Fengyu Yang, Jiacheng Zhang, **Andrew Owens**. Generating Visual Scenes from Touch. *International Conference on Computer Vision (ICCV)*, 2023.

[13] Lukas Höllein, Ang Cao, **Andrew Owens**, Justin Johnson, Matthias Nießner. Text2Room: Extracting Textured 3D Meshes from 2D Text-to-Image Models. *International Conference on Computer Vision (ICCV)*, 2023.

[14] Jiatian Sun, Longxiulin Deng, Triantafyllos Afouras, **Andrew Owens**, Abe Davis. Eventfulness for Interactive Video Alignment. *Proceedings of ACM SIGGRAPH*, 2023.

[15] Chenhao Zheng, Ayush Shrivastava, **Andrew Owens**. EXIF as Language: Learning Cross-Modal Associations Between Images and Camera Metadata. *Computer Vision and Pattern Recognition (CVPR)*, 2023.

[16] Rui Guo, Jasmine Collins, Oscar de Lima, **Andrew Owens**. GANmouflage: 3D Object Nondetection with Texture Fields. *Computer Vision and Pattern Recognition (CVPR)*, 2023.

[17] Chao Feng, Ziyang Chen, **Andrew Owens**. Self-Supervised Video Forensics by Audio-Visual Anomaly Detection. *Computer Vision and Pattern Recognition (CVPR)*, 2023.

[18] Yuexi Du, Ziyang Chen, Justin Salamon, Bryan Russell, **Andrew Owens**. Conditional Generation of Audio from Video via Foley Analogies. *Computer Vision and Pattern Recognition (CVPR)*, 2023.

[19] Kim Sung-Bin, Arda Senocak, Hyunwoo Ha, **Andrew Owens**, Tae-Hyun Oh. Sound to Visual Scene Generation by Audio-to-Visual Latent Alignment. *Computer Vision and Pattern Recognition (CVPR)*, 2023.

[20] Fengyu Yang, Chenyang Ma, Jiacheng Zhang, Jing Zhu, Wenzhen Yuan, **Andrew Owens**. Touch and Go: Learning from Human-Collected Vision and Touch. *Neural Information Processing Systems (NeurIPS) - Datasets and Benchmarks Track*, 2022.

[21] Ziyang Chen, David F. Fouhey, **Andrew Owens**. Sound Localization by Self-Supervised Time Delay Estimation. *European Conference on Computer Vision (ECCV)*, 2022.

[22] Artem Abzaliev, **Andrew Owens**, Rada Mihalcea. Towards Understanding the Relation between Gestures and Language. *International Conference On Computational Linguistics (COLING)*, 2022.

[23] Tingle Li, Yichen Liu, **Andrew Owens**, Hang Zhao. Learning Visual Styles from Audio-Visual Associations. *European Conference on Computer Vision (ECCV)*, 2022.

[24] Zhangxing Bian, Allan Jabri, Alexei A. Efros, **Andrew Owens**. Learning Pixel Trajectories with Multiscale Contrastive Random Walks. *Computer Vision and Pattern Recognition (CVPR)*, 2022.

[25] Daniel Geng, Max Hamilton, **Andrew Owens**. Comparing Correspondences: Video Prediction with Correspondence-wise Losses. *Computer Vision and Pattern Recognition (CVPR)*, 2022.

[26] Xixi Hu, Ziyang Chen, **Andrew Owens**. Mix and Localize: Localizing Sound Sources in Mixtures. *Computer Vision and Pattern Recognition (CVPR)*, 2022.

[27] Medhini Narasimhan, Shiry Ginosar, **Andrew Owens**, Alexei A. Efros, Trevor Darrell. Strumming to the Beat: Audio-Conditioned Contrastive Video Textures. *Winter Conference on Applications of Computer Vision (WACV)*, 2022.

[28] Ziyang Chen, Xixi Hu, **Andrew Owens**. Structure from Silence: Learning Scene Structure from Ambient Sound. *Conference on Robot Learning (CoRL)*, 2021.

[29] Linyi Jin, Shengyi Qian, **Andrew Owens**, David F. Fouhey. Planar Surface Reconstruction from Sparse Views. *International Conference on Computer Vision (ICCV)*, 2021.

[30] Allan Jabri, **Andrew Owens**, Alexei A. Efros. Space-Time Correspondence as a Contrastive Random Walk. *Neural Information Processing Systems (NeurIPS)*, 2020.

[31] Triantafyllos Afouras, **Andrew Owens**, Joon Son Chung, Andrew Zisserman. Self-Supervised Learning Of Audio-Visual Objects From Video. *European Conference on Computer Vision (ECCV)*, 2020.

[32] Sheng-Yu Wang, Oliver Wang, Richard Zhang, **Andrew Owens**, Alexei A. Efros. CNN-generated images are surprisingly easy to spot... for now. *Computer Vision and Pattern Recognition (CVPR)*, 2020.

[33] Tianfan Xue, **Andrew Owens**, Daniel Scharstein, Michael Goesele, Richard Szeliski. Multi-frame stereo matching with edges, planes, and superpixels. *Image and Vision Computing*, 2019.

[34] Sheng-Yu Wang, Oliver Wang, **Andrew Owens**, Richard Zhang, Alexei A. Efros. Detecting Photoshopped Faces by Scripting Photoshop. *International Conference on Computer Vision (ICCV)*, 2019.

[35] Shiry Ginosar, Amir Bar, Gefen Kohavi, Caroline Chan, **Andrew Owens**, Jitendra Malik. Learning Individual Styles of Conversational Gesture. *Computer Vision and Pattern Recognition (CVPR)*, 2019.

[36] **Andrew Owens**, Alexei A. Efros. Audio-Visual Scene Analysis with Self-Supervised Multisensory Features. *European Conference on Computer Vision (ECCV)*, 2018.

[37] Minyoung Huh, Andrew Liu, **Andrew Owens**, Alexei A. Efros. Fighting Fake News: Image Splice Detection via Learned Self-Consistency. *European Conference on Computer Vision (ECCV)*, 2018.

[38] Roberto Calandra, **Andrew Owens**, Dinesh Jayaraman, Justin Lin, Wenzhen Yuan, Jitendra Malik, Edward H. Adelson, Sergey Levine. More Than a Feeling: Learning to Grasp and Regrasp using Vision and Touch. *Robotics and Automation Letters (RA-L)*, 2018.

[39] Xiuming Zhang, Tali Dekel, Tianfan Xue, **Andrew Owens**, Qiurui He, Jiajun Wu, Stefanie Mueller, William T. Freeman. MoSculp: Interactive Visualization of Shape and Time. *User Interface Software and Technology (UIST)*, 2018.

[40] **Andrew Owens**, Jiajun Wu, Josh McDermott, William T. Freeman, Antonio Torralba. Learning Sight From Sound: Ambient Sound Provides Supervision for Visual Learning. *International Journal of Computer Vision (IJCV)*, 2018.

[41] Roberto Calandra, **Andrew Owens**, Manu Upadhyaya, Wenzhen Yuan, Justin Lin, Edward H. Adelson, Sergey Levine. The Feeling of Success: Does Touch Sensing Help Predict Grasp Outcomes?. *Conference on Robot Learning (CoRL)*, 2017.

[42] Wenzhen Yuan, Chenzhuo Zhu, **Andrew Owens**, Mandayam Srinivasan, Edward H. Adelson. Shape-independent Hardness Estimation Using Deep Learning and a GelSight Tactile Sensor. *International Conference on Robotics and Automation (ICRA)*, 2017.

[43] **Andrew Owens**, Jiajun Wu, Josh McDermott, William T. Freeman, Antonio Torralba. Ambient Sound Provides Supervision for Visual Learning. *European Conference on Computer Vision (ECCV)*, 2016.

[44] **Andrew Owens**, Phillip Isola, Josh McDermott, Antonio Torralba, Edward H. Adelson, William T. Freeman. Visually Indicated Sounds. *Computer Vision and Pattern Recognition (CVPR)*, 2016.

[45] **Andrew Owens**, Connelly Barnes, Alex Flint, Hanumant Singh, William T. Freeman. Camouflaging an Object from Many Viewpoints. *Computer Vision and Pattern Recognition (CVPR)*, 2014.

[46] David Crandall, **Andrew Owens**, Noah Snavely, Dan Huttenlocher. SfM with MRFs: Discrete-Continuous Optimization for Large-Scale Structure from Motion. *Transactions on Pattern Analysis and Machine Intelligence (PAMI)*, 2013.

[47] **Andrew Owens**, Jianxiong Xiao, Antonio Torralba, William T. Freeman. Shape Anchors for Data-Driven Multi-view Reconstruction. *International Conference on Computer Vision (ICCV)*, 2013.

[48] Jianxiong Xiao, **Andrew Owens**, Antonio Torralba. SUN3D: A Database of Big Spaces Reconstructed using SfM and Object Labels. *International Conference on Computer Vision (ICCV)*, 2013.

[49] David Crandall, **Andrew Owens**, Noah Snavely, Dan Huttenlocher. Discrete-Continuous Optimization for Large-Scale Structure from Motion. *Computer Vision and Pattern Recognition (CVPR)*, 2011.

Theses:

[1] Andrew Owens. Learning Visual Models from Paired Audio-Visual Examples. *Ph.D. Thesis, Massachusetts Institute of Technology*, 2016.

[2] Andrew Owens. Combining Recognition and Geometry for Data-Driven 3D Reconstruction. *M.S. Thesis, Massachusetts Institute of Technology*, 2013.

Talks

Learning by Audio-Visual Analogy
Keynote Address, DCASE Workshop — September 21, 2023

Tactile-Augmented Radiance Fields
CompVision meeting, UC Berkeley — February 28, 2024

Multimodal Learning from the Bottom Up
UPenn GRASP SFI Seminar — February 7, 2024
Guest lecture: CMU Seminar on Multimodal Foundation Models (Host: Deva Ramanan) — November 6, 2023
AI Video Symposium at Google DeepMind — October 1, 2023
Stanford University, Jiajun Wu's group — March 2023
Adobe Research — March 2023
UC Berkeley, BAIR — March 2023

Learning Multimodal Models of the Physical World
Oxford Visual Geometry Group (VGG) — September 26, 2023
Caltech Vision Group — August 2023
Notre Dame — August 2023

Sound Localization from Motion, paper talk
ICCV AV4D workshop — October 2023

Image Forensics as Open World Perception
CVPR "Visual Perception and Learning in an Open World" Workshop — June 2023

Cross-modal synthesis from sight, sound, and touch
AAAI Creative AI Across Modalities Workshop — February 2023

Learning Visual, Audio, and Cross-Modal Correspondences
CMU VASC Seminar — November 2022

Learning Correspondences with Contrastive Random Walks
ECCV "What is Motion For?" Workshop — October 24, 2022

Sound Localization by Self-Supervised Time Delay Estimation, paper talk
ECCV AV4D workshop — October 23, 2022

Learning to Represent and Synthesize Motion
University of Rochester – Computer Vision Seminar — April 2021

Learning Image Forensics
Google Computational Imaging Workshop — March 2020

Learning Audio-Visual Objects
ECCV Multi-Modal Video Analysis Workshop — August 2020

Learning Sight from Sound
Oxford University — September 2019
Facebook AI Video Summit — June 2019
CVPR Multimodal Learning and Applications Workshop — June 2019
Google Machine Perception Workshop — October 2018
RSS Workshop on Multi-Modal Perception and Control — May 2018
Toyota Technological Institute Chicago — March 2018

Audio-Visual Scene Analysis with Self-Supervised Multisensory Features
Oral presentation, ECCV 2018 — September 2018

Self-Supervising Sight, Sound, and Image Forensics
CVPR Workshop, Beyond Supervised Learning — May 2018
University of Southern California — October 2018

Visually Indicated Sounds
Oral presentation, CVPR 2016 — June 2016

Ambient Sound Provides Supervision for Visual Learning
Oral presentation, ECCV 2016 — October 2016

Sound Provides Supervision for Visual Learning
CMU Robotics Institute — April 2016

Camouflaging an Object From Many Viewpoints
Oral presentation, CVPR 2014 — June 2014

Guest Lecture, CS194-26, UC Berkeley — October 2016 and 2017

Professional Activities

CVPR Workshop Chair (2024)

Lead organizer, *Sight and Sound* workshop at CVPR 2018-2024.

Co-organizer, *AV4D: Visual Learning of Sounds in Spaces* workshop, ECCV 2022, ICCV 2023.

Co-organizer, *Open World Vision* workshop, CVPR 2021-2024.

Co-organizer, *Embodied Multimodal Learning* workshop at ICLR 2021.

Reviewer: CVPR (2015-2020, 2022), ICCV (2015, 2017, 2019, 2021), ECCV (2016, 2018, 2020, 2022), SIGGRAPH (2020, 2024), SIGGRAPH Asia (2024), ICLR (2018, 2019, 2021, 2022), ICRA (2019, 2020), ICML (2017), NeurIPS (2017, 2019, 2021, 2022), CHI (2018), UIST (2019), ACL (2022), CoRL (2022), ICASSP (2023)

Area Chair: CVPR (2021, 2023, 2024), NeurIPS (2023), NeurIPS Dataset and Benchmarks (2022), WACV (2023), ICCV (2023), ECCV (2024)

NSF Panelist (2023, 2024)

PhD Students Supervised

Daniel Geng. UMich PhD student, 2020 - present
NSF Graduate Research Fellow

Ayush Shrivastava. UMich PhD student, 2021 - present

Ziyang Chen. UMich PhD student, 2022 - present

Jeongsoo Park. UMich PhD student, 2023 - present

Yiming Dou. UMich PhD student, 2023 - present

Samanta Rodriguez (co-advised with Nima Fazeli). UMich PhD student, 2024 - present

Chao Feng. UMich PhD student, 2024 - present

Xuanchen Lu. UMich PhD student, 2024 - present

Other Advising

Xixi Hu. UMich MS, 2020 - 2021 → UT Austin CS PhD

Jing Zhu. UMich undergrad, 2020 - 2021 → UMich CS PhD

Max Hamilton, UMich MS, 2021 - 2022 → UMass Amherst CS PhD

Zhangxing Bian, UMich MS, 2020 - 2021 → Johns Hopkins PhD

Yuexi Du, UMich undergrad, 2021 - 2022 → Yale CS PhD

Rui Guo, UMich MS, 2021 → Xmotors.ai

Oscar de Lima, 2020. UMich MS → Neato Robotics

Fengyu Yang, UMich undergrad, 2021 - 2023 → Startup founder / Yale PhD
CRA Outstanding Undergraduate Award Runner-up

Chenhao Zheng, UMich undergrad 2022 → UW PhD
CRA Outstanding Undergraduate Award Honorable Mention

Jiacheng Zhang, UMich undergrad, 2022 - 2023 → UMich PhD

Chenyang Ma, 2021 - 2022. UMich undergrad → Cambridge MS

Sheng-Yu Wang. UC Berkeley Undergrad, 2018 - 2019 → CMU PhD

Minyoung Huh. UC Berkeley Undergrad, 2017 → MIT PhD

Zhaoying Pan, UMich MS, 2022 - 2023 → Purdue PhD

PhD Thesis Committees

Mandela Patrick (Oxford; chair: Andrea Vedaldi), 2021

Ryan Szeto (UMich; chair: Jason Corso), 2021

Wonhui Kim (UMich; chair: Matt Johnson-Roberson), 2021

Junming Zhang (UMich; chair: Matt Johnson-Roberson), 2022

Yizhen Zhang (UMich; chair: Zhongming Liu), 2021

Moitreya Chaterjee (UIUC; chair: Narendra Ahuja), 2022

Haozhu Wang (UMich; chair: Jay Guo), 2022

Madan Ganesh (UMich; chair: Jason Corso), 2022

Oana Ignat (UMich; chair: Rada Mihalcea), 2022

Shurjo Banerjee (UMich; chair: Jason Corso), 2022

Rodrigo Mira (Imperial College London; chair: Björn Schuller), 2023

Yu Chen (UMich; chair: Hun-Seok Kim), 2023

Mingyu Yang (UMich; chair: Hun-Seok Kim), ongoing

Asiegbu Miracle Kanu-Asiegbu (UMich; chairs: Xiaoxiao Du and Ram Vasudevan), ongoing

Santiago Castro (UMich; chair: Rada Mihalcea), 2024

Nathan Louis (UMich; chair: Jason Corso), 2024

Ekdeep Singh Lubana (UMich; chair: Robert Dick), 2024

Nilesh Kulkarni (UMich; chairs: David Fouhey and Justin Johnson), 2024

Karan Desai (UMich; chair: Justin Johnson), 2023

Mohamed El Banani (UMich; chair: Justin Johnson), 2023

Dídac Surís (Columbia; chair: Carl Vondrick), 2024

Christopher Rockwell (UMich; chairs: David Fouhey and Justin Johnson), ongoing

Selected Press Coverage of My Work

In Motion, an art exhibit based on our motion sculpture work. MIT Museum, 2019

MIT Develops a Novel Camouflaging Algorithm That Hides Eyesores. *Wired*, 2014.

MIT researchers built an AI that predicts what the world sounds like. *Quartz*, 2016.

This computer is selecting sound effects for silent videos that seem so real humans can't tell they're fake. *Washington Post*, 2016.

Creating 3D sculptures from 2D video and other news. *BBC*, 2018.

New algorithm can help spot faked photos before they go viral. *New Scientist*, 2018.

Press Coverage as Third-Party Expert

Teaching artificial intelligence to connect senses like vision and touch. *MIT News*, 2019.

Is technology spying on you? New AI could prevent eavesdropping. *Science*. 2022.

Paparazzi Photos Were the Scourge of Celebrities. Now, It's AI. *Wall Street Journal*, 2023.